SQUILL IN THE 17TH AND 18TH CENTURIES*

DAVID L. COWEN

Professor and Chairman, Department of History
University College, Rutgers University
New Brunswick, N. J.

IN the official compendia of drugs and the related private dispensatories which called themselves pharmacopoeias and flourished in the 16th and 17th centuries, the root of squill took its place among the multifarious simples and varied dosage forms that challenged the art of the apothecary. The Augsburg Pharmacopoeia of 1564, for example, not only provided for *acetum scilliticum* and two lohochs, two oxymels, and the troche of squill—all attributed to either Galen or Mesuë—but placed all of them among the materia pharmaceutica which the apothecary was obligated to keep in stock. The Köln *Dispensarium* of 1565 included the vinegar, the oxymel, and the troche of squill.

In its first edition (1618) the London Pharmacopoeia, perhaps the most influential of all official compendia throughout Europe in the 17th and 18th centuries,[1] gave directions for the making of prepared squill and provided for the vinegar, the wine, and the troche of squill. In addition, squill was included in at least four of the polypharmaceuticals that were so popular at the time. In the third edition (1677), the London Pharmacopoeia added a honey, oxymel, and lohoch of squill to this list.

Similarly, squill is to be found in other pharmacopoeias and dispensatories of the era. Quercetanus in his *Pharmacopoea Dogmaticorum* (Venice, 1614), added an extract, a sugar, and the tartar (*faecula*) of squill. The Amsterdam Pharmacopoeia of 1636 more simply included the vinegar, the oxymel, and two formulas for *Scillae ad Theriac* (the usual use of the troches). Charas' *Pharmacopée Royale* restricted itself to the vinegar, the oxymel, and the troches.

The virtues attributed to squill were characteristic of the traditional, uncritical acceptance of much of the ancient materia medica. William Salmon's account is typical:

*Presented as part of a *Symposium on Squill.*

> *Squillae*, Of Squils, or Sea Onion, hot and dry in 2°, chuse that which is fresh and full of juyce. It is prepared by baking of it in Dough, and drying of it, of which is made Vinegar, Wine, Oly [sic] &c. It provokes Urine, opens the Spleen and Liver, helps Jaundice, Dropsy, and wringing of the Guts, as also the Cough Asthma, and biting of Venemous Creatures: it kills worms, expels poyson, and easeth pains of the head[,] Stomach and heart: it clears the sight, and is beneficial to dry up running sores, and fortifies the Body against all manner of maligne and Pestilential Diseases, &c.[2]

Lemery's more fulsome account similarly stressed, among the long list of virtues, the ability of squill to free the lungs of phlegm and to open obstructions of the kidney.[3] Less typical than Salmon and Lemery, but nevertheless noteworthy, was the postscript to the litany of virtues in Johannes Schroeder's *Pharmacopoeia Medico-Chyrurgica:* "Note: It is said to drive away witchcraft and incantations."[4]

Significant in the accounts of Salmon, Lemery, and Schroeder is the appearance in all three of the two qualities that were to dominate the 17th century use of squill: as a diuretic in dropsies and as an expectorant in asthma (a term which then probably included a great variety of coughs).

Undoubtedly squill found use in medical practice in the 17th century. It appears in a 1661 inventory of a pharmacy in London[5] and on the inscription of drug jars.[6] But these manifestations and its inclusion in formularies do not prove that squill was in great demand by medical practitioners.[7] In England, for example, John Locke's medical notes for 1670,[8] containing many prescriptions that he used in his practice, mentioned squill not once. An analysis of approximately 250 prescriptions in the 1696-1697 records[9] of the prominent London apothecary, James Petiver, revealed not a single instance of the use of squill. A list of the materia medica used by Sydenham that was compiled by his biographer[10] does not include squill. The first edition of the Edinburgh Pharmacopoeia, issued in 1699, hardly a critical compilation, retained the bulb of squill among the simplicia, and described only the vinegar of squill. In France, Charas wrote, "Physicians seldom prescribe the vinegar of squill."[11]

It thus seems probable that squill was losing rather than gaining favor toward the end of the 17th century. Perhaps responsible were the criti-

cisms of such authorities as Zwelfer, who, in his animadversions on the Pharmacopoeia Augustana called some preparations of squill useless and inept.[12] His comments were noted by others.[13] Squill, moreover, had been recognized as a dangerous drug since antiquity.[14]

In the 18th century the popularity of the sea onion seems to have increased. The Edinburgh Pharmacopoeia, for example, reflects this; its second edition (1722) added the oxymel and the troche, and its third (1744) added the pills and syrup of squill. Drug jars with inscriptions of "Oxym. Scill." are relatively easy to find[15] and the *oxymel scilliticum* was commonly found in the medicine chests of ship surgeons.[16] Dissertations on squill began to appear.

George L. Corvinus published his Nuremberg dissertation *Dissertatio Botanico-Medica Inauguralis de Scilla* in 1715 (at Altorf). Hirschfeld regarded this essay as of little merit,[17] for it was largely concerned with a compilation of ancient authors, with the etymology of the term scilla, and with the pharmaceutical preparation of various dosage forms, and was neither critical nor experimental in tone, yet it was significant for its recognition of the diuretic virtues of squill, and especially for its thorough and scholarly review of the old and then-current literature on the drug. Especially interesting was its iatrophysical interpretation of the mechanism of action of the drug. "The virtue of penetrating and cleansing is wholly predominant," he wrote, "owing to abundant saline-sulphur molecules both pungent and bitter; quite often the ventricles and the fibers of the intestines are unable to endure the sharp stimulus of these molecules, so that as soon as they make their tiny entrances, a great abundance of humors may stream into the empty parts of the opened vessels and nausea, vomiting, and purging may follow."[18] At about the same time John Radcliffe was attributing the expectorant effect of squill to its "saline particles [which give] a shock to the internal membrane of the Lungs and Trachea; and thus a Contraction begun, shakes off the Load."[19]

Corvinus' work was certainly more interesting than that of J. G. Richter, whose Halle dissertation of 1722, *De Scilla*, was largely botanical. It presented an uncritical array of the literature and even recommended squill in tuberculosis and scurvy.

The dissertation of J. G. Meder, also issued at Halle (1739), called *Examen Chemicum Radicis Scillae Marinae* was explicit about the growing popularity of the drug. Squill "had been biding its time in

exile," Meder wrote, but it had been "restored" to use "in our age," extolled, and recommended "with enthusiasm."[20] It is pertinent that the Edinburgh Pharmacopoeia, in its fourth edition of 1744, contained a greater number of dosage forms of squill than it contained before or after.

Meder's work was typical of the 18th century approach to drug therapy. The "chemical" analysis of the root by distillation and extraction seemed only to be an exercise in tautology: there was found a "pungent salt," *sal acre*, that was heating, caustic, sharp, penetrating, and harsh. It was therefore useful where an "atony of solids or inertia of fluids, viscosity, impure acid-tartar or gravel caused stagnation or immobility," for it could bring loosening, fluid-thinning, motion-causing activity to the site—especially in soporific conditions, phlegmatic apoplexy, epilepsy, persistent catarrh, paralysis, suffocating catarrh, phlegmatic and cachetic asthma, chronic cough, jaundice from gravelly bile, mucous, sluggish, and phlegmatic nephritis, incipient calculus, dropsy, persistent obstructions of the liver, of the spleen, of the mesenteric vessels, of the menses and of hemorrhoids, dyspepsia from frequent indigestion, quartan fevers, coagulation (*congrumatus*) of the blood, cold scurvy, cachexy, edema of the feet and hands, and similar diseases. Meder was undoubtedly one of the more enthusiastic of the new champions of squill.

The savants who were reviving the use of squill included the master at Halle, Friedrich Hoffmann. Meder's account shows the obvious influence of Hoffmann's solidistic pathology, and Meder's "chemical analysis" was an extension of Hoffmann's characterization of squill as consisting of very subtle, sharp, and caustic elements.[21] More to the point, however, is that in 1740 Hoffmann called squill a "marvelous thing" and characterized its effectiveness in "alleviating the terrible paroxism of asthma" as "astonishing."[22] His account of the virtues of squill, which refers to dropsy as well as to asthma, is more modest than Meder's, but also enthusiastic.[23] Praise from him could hardly have gone unnoticed.

In the meantime squill had received praise from Boerhaave himself,[24] and two German monographs on the drug had appeared. One of these, by J. H. Schulze and C. A. Schröter, described asthmatic diseases as due to copious and stagnant blood; squill, possessing the characteristics ascribed to it by Hoffmann, was therefore effective in such diseases.[25]

The other monograph, composed by J. G. Wagner, dealt mainly with squill as a diuretic.[26] Wagner's recommendation that nitre be administered along with squill for edema and nephritis made a sufficient impression on William Lewis in England for him to give currency to it, with credit to Wagner.[27]

Thus, the diuretic effects of squill had never been forgotten in the literature. In 1750 the use of the drug in dropsy was given further popularity by Richard Russell's passing reference in his Edinburgh dissertation on sea water and glandular affections.[28] In 1751 Richard Mead, in his *Monita et Praecepta Medica*, and in 1757 Gottwald Schuster, in his *Dissertatio*, extolled the value of squill in dropsy.[29] In 1753 the dispensatories of William Lewis and Richard Brookes[30] and in 1759 the Edinburgh dissertation of John Brickenden[31] all recognized the diuretic and expectorant actions—and the emetic and purgative effects also. It is difficult to understand how Van Swieten later gained credit for the reintroduction of squill as a remedy for dropsy.[32]

But even if Van Swieten cannot be credited with the reintroduction of squill, unquestionably he brought a semblance of reasonableness and clarity to the administration of the drug. In 1764 he wrote:

> Many other plants have been recommended for their diuretic quality. . . . But the root of the sea-onion, or squills, deserves the first rank. This was a medicine in great esteem with the ancient physicians, for the cure of many obstinate diseases, especially when infused in wine or vinegar. I order half an ounce of the fresh root to be infused in two pints of wine, half an ounce of which, I give to a grown person in the morning fasting. A slight nausea commonly follows without vomiting, and soon after there comes on a plentiful flow of urine. The dose may be lessened or increased according to the age and strength of the patient, but so proportioned as to occasion a slight nausea only, for if it vomited, no great discharge of urine followed.[33]

Though much more deliberate, Van Swieten's procedure was really more heroic than that of his predecessors. They had feared the great power of the root and had administered it in mild doses or had weakened it in complex dosage forms and by intricate pharmaceutical procedures. Van Swieten, however, insisted on full-strength, fresh squill, albeit in relatively small and controlled doses. This was his great contribution to squill therapy.[34]

Both of Van Swieten's main recommendations encountered difficulty. The use of fresh squill was not adopted universally. John Pringle, for example, suggesting (in 1771) changes in the Edinburgh Pharmacopoeia for its sixth (1774) edition, pointed out that the fifth edition (1756) had failed to designate fresh or dried squill in the *acetum*.[35] He expressed a preference for the dried root, as in the London Pharmacopoeia, and when the sixth edition of the Edinburgh compendium appeared, it called for *radicis scillae siccatae*. Throughout their long history from 1753 to 1830 the *New Dispensatory* and its successor, the *Edinburgh New Dispensatory*, called for dried squill.

More important was the rejection of Van Swieten's recommendations with regard to vomiting. In 1780 Francis Home was to publish 10 case histories in which squill had been used as a diuretic.[36] Home continued the use of squill to the point of forcing emesis. He insisted that "after the fact of vomiting was over, the hydropic swellings and symptoms were either much abated or entirely gone." He was the only one practicing his "emetic method," he contended.[37] He pointed to the "cure" of seven of 10 patients in whom he had induced vomiting, and to failure in the three who had not been brought to vomiting. Dr. Russell, not Van Swieten, was considered the advocate of the avoidance of emesis. Home insisted that his own was "the speediest method of cure." The diuretic and purgative effect of the squill, Home acknowledged, did lower the swelling somewhat, but after a few days on the drug severe nausea and vomiting, attended by severe stomach pains, emptied the vascular system and made it possible for the lymphatics to absorb more plentifully from the cavities, especially the abdomen. The convulsive motion of the diaphragm, the abdominal muscles, and all the muscles of the body exerted a pressure that evacuated the hydropic waters from the body, he said.[38]

The neat case histories on which Home based his conclusions apparently did not impress his colleague at Edinburgh, William Cullen. "A certain writer has alleged," Cullen wrote in 1789, "that the diuretic effects of the squill is not to be expected unless it shows some operation on the stomach. . . . I have often observed, that when the squill operates strongly in the stomach and intestines, that the diuretic effects were less ready to happen." Cullen recognized the expectorant, emetic, and purgative qualities of squill. He found ipecac a better emetic than squill since it was more manageable and less harsh. He attributed the

diuretic powers of squill to an "acrimony" it contained that made it pass readily to the kidneys, where it increased the secretion. Contrary to Home, and reminiscent of Van Swieten, Cullen recommended that the emetic and purgative effects of squill be avoided, that squill be given in small doses to be repeated at "proper intervals," even to the extent of accompanying the squill with an opiate to minimize the emetic and purgative activity. Cullen departed from Van Swieten, however, in recommending the dried rather than the fresh plant. Drying drove off some of the volatile acrimony; it made the drug less likely to act on the stomach and more likely to proceed directly to the kidneys. In dropsy Cullen recommended that a neutral salt or mercury be administered with the squill.[39]

Cullen's mechanism of action may be no more convincing to moderns than that of Home, but the work of both suggests the dawn of a new, critical, clinical approach to pharmacology. But Home, who may well have influenced the heroic medical practice of the next century, probably never recognized how close he had come to greatness. Home was to make what, in hindsight, was a most exciting observation. When, after a few days, the administration of squill brought nausea, vomiting, and acute abdominal pain, Home noticed that:

> During this fit, the pulse is remarkably slow. I was amazed when the symptom was first observed and was afraid of danger, which made me give laudanum and cordials, to stop the vomiting; but I have since found it to be a constant effect of that state, and attended with no danger. It is not, perhaps, very easy to explain the cause of this symptom; but probably it either arises from the brain and the heart being defrauded of blood, as the pressure is removed from the aorta descendens; or from the acute pain of the stomach, as the slowest pulses, with which I have met, have been accompanied with pain.[40]

Withering had had his Ferriar[41] before the century was over; Home's difficulties in explaining the symptoms and the development of the cardiac glycosides had to await another century and another scientific climate.

One final consideration. As the 18th century came to a close the newness of its "new chemistry" limited the understanding of the materia medica, of course including squill. The attempts at chemical analysis that had been made previously were, like those of Meder noted above,

exercises in naming physical properties. Analyses performed at the end of the century were little better. Eustathius Athanasius, in a dissertation presented at Halle in 1794, found squill to consist of a sharp volatile principle, a bitter gummy part, starch, albuminous material, and a fibrous part. In the same year, Johann Trommsdorff did somewhat better, even if his analysis may have little meaning today. He found, as primary constituents, bitter, gummy, and slimy parts, and resin, and no definite volatile parts and, as "secondary constituents," phlogiston, carbonic acid, saccharic acid, phosphoric acid, digestive salt, vitriolized cream of tartar, mineral alkali, calcium oxide, and silica.[42]

The pharmacological efforts of Van Swieten, Home, and Cullen and the chemical efforts of Athanasius and Trommsdorff must be evaluated in terms of the science of their day. These efforts were significant, even creative, but they occurred in a field where tradition and authority had long held sway and where science was still feeble. There is no better way to illustrate this than to point out, as Athanasius did, that in 1794 there were 18 different dosage forms of squill listed in the literature.

NOTES AND REFERENCES

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3. Lemery, N.: *Pharmacopée Universelle.* Paris, d'Houry 1698, pp. 164, 394.
4. Book IV, p. 154. Ulm, Gerlini, 1650.
5. Public Record Office. Ms. C 104/131.
6. Lothian, A.: *Vessels for Apothecaries.* Reprinted from *Connoisseur Yearbook.* London, 1953, p. 3; Thomann, H. E.: Weitere Beitrag zu den Sammlungen antiker Apothekengefässe. *Zur Ges. Pharm. 18:*1, 5, 1967.
7. One is reminded of Jean-François Coste's comment that only a tenth of the medicaments in his *Compendium Pharmaceuticum,* used by the French Army in the American Revolution, had actually been put to use. See Lane, J. E.: Jean-François Coste. *Americana 22:*59, 1928.
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11. Charas, M.: *The Royal Pharmacopoeia.* London, Starkey, 1678, p. 66.
12. *Pharmacopoeia Augustana Reformata.* Rotterdam, Leers, 1653, p. 734.
13. Charas, M., op. cit., p. 181; Corvinus, G. L.: *Dissertatio Botanico-Medica Inauguralis de Scilla.* Altorf, Meyer, 1715, pp. 20, 22.
14. Stoll, A., Suter, E., Kreis, N., Bussemaker, B. D., and Hofmann, A.: Die herzaktiven Substanzen der Meerzwiebel. *Helv. Chim. Acta 16:*704, 1933. See also Corvinus, op. cit., p. 15, and Mors repentina hydropici, post usum aceti scillitici. *Acta Helv. Phys. Math. Bot. Med. 5:* 328-30, 1762.
15. See Wittop Koning, D. A.: *Delfste*

Apothekerspotten. Deventer, Borst, 1954, pp. 170, 172, 194; Crellin, J. K.: *Medical Ceramics.* London, Wellcome Inst. of the Hist. of Med., 1969, pp. 114-115; and Hein, W.-H. and Wittop Koning, D. A.: *Bildkatalog zur Geschichte der Pharmazie.* Stuttgart, Wissenschaftliche Verlagsgesellschaft MBH, 1969, p. 72.

16. Müller, I.: *Untersuchungen zur Arzneimittelversorgung an Bord. . . .* Düsseldorf, 1969, p. 598. (Fifteen instances from 1695 to 1798 on British, Baltic, Portuguese, French, Dutch, American, and Italian ships are listed.) Surgeon George Brown used oxymel of squill on five patients (as an expectorant) while *H.M.S. Abergavenny* was in the West Indies in 1797-1798. *Med. J. H.M.S. Abergavenny,* Public Record Office Ms. Adm. 101/80/2.
17. Hirschfeld, E.: Studien zur Geschichte der Heilpflanzen. *Kyklos 2:*174, 1929.
18. Ibid., p. 16.
19. *Pharmacopoeia Radcliffeana.* London, Rivington, 1716, pp. 99-100.
20. The statements from Meder in this and the next paragraph are taken from the Latin quotation in Hirschfeld, loc. cit., p. 175.
21. Hoffmann, F.: *Medicinae Rationalis Systematicae.* Halle, Reuger, 1734, vol. 4, Part 3, pp. 345-46.
22. I have used Hirschfeld's (loc. cit., p. 175) Latin quotation from Hoffmann's *Opera Omnia.* Geneva, 1740, vol. 3, p. 102.
23. Ibid.
24. Boerhaave called the oxymel of squill praiseworthy and best for dissolving phlegm. *Historia Plantarum.* Rome, Gonzagam, 1727, p. 615.
25. *Disseratatio Sistens Aegrotum Asthmaticum Usu Radicis Scillae Sublevatum.* Halle, 1735. In: Haller, A.: *Disputationes ad Morborum.* Lausanne, Bousquet, 1757, vol. 2, pp. 139-66.
26. *De Admirandis quibusdam Scillae in Pulvere Exhibitae Virtutibus,* Part II of his *Observationes Clinicae.* Lübeck, 1737. In: Haller, op. cit., pp. 172-206.
27. *The New Dispensatory.* London, Nourse, 1753, p. 203.
28. The dissertation was translated into English under the title *A Dissertation on the Use of Sea-Water.* London, Owen, 1753. See p. 57.
29. Both are cited by Hirschfeld, loc. cit., p. 176. See also Jarcho, S.: A treatise on squill (Gottwald Schuster, 1757). *Bull. N.Y. Acad. Med. 50:*723-46, 1974.
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33. Hossack, C.: *An Abridgement of Baron Van Swieten's Commentaries upon the Aphorisms of . . . Dr. Herman Boerhaave.* London, Longman and Horsfeld, 1775, p. 121.
34. See Hirschfeld, loc. cit., p. 173 and Stoll, loc. cit., p. 705.
35. Pringle to the President of the Royal College of Physicians of Edinburgh, dated London, Nov. 8, 1771. R.C.P.E. Ms. Pringle Letters.
36. *Clinical Experiments, Histories, and Dissections,* 2d ed. London, Murray, 1782, pp. 387-405.
37. Yet William Buchan's highly popular *Domestic Medicine* recommended "strong vomits" for dropsy: "For an adult, half a dram of ipecacuanha in powder and half an ounce of oxymel of squills, will be a proper vomit. This may be repeated three or four times." The quotation is from the Philadelphia printing, Aitken, 1772, p. 266.
38. Home, op. cit., pp. 387, 402-04.
39. Cullen, W.: *A Treatise of the Materia Medica.* Dublin, White, 1789, vol. 2, pp. 400, 465-67.
40. Home, op. cit., p. 403.
41. Ferriar, J.: *An Essay on the Medical Properties of the Digitalis Purpurea.* Manchester, Sowler and Russell, 1799. (Ferriar pointed up the cardiac effects of digitalis.)
42. This account of Athanasius and Trommsdorff follows Hirschfeld, loc. cit., pp. 176-77.